

Artificial intelligence, platelets and aspirin

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An inspiring and timely review by Paolo Gresele, published in *Bleeding, Thrombosis and Vascular Biology* (BTVB), at the end of last year,¹ fascinated me through the description of applications of artificial intelligence (AI) in the field of hemostasis and thrombosis, examining its advantages, drawbacks and future perspectives.

A recent bibliometric analysis by Ganjavi *et al.* in the BMJ tried to determine the extent and content of academic publishers' and scientific journals' guidance to authors on the use of generative AI.² They found that guidelines by some top publishers and journals were lacking, while the proposed guidelines by others varied substantially with some heterogeneity persisting between affiliated publishers and journals. They suggest that since AI continues to grow in popularity, standardized guidelines to protect the integrity of scientific output are needed.

A comment to this BMJ paper, published in *Nature*,³ underlines that large language models are transforming scientific writing and publishing. The Author recalls that in a 2023 *Nature* survey of more than 1600 scientists, almost 30% said that they had used generative AI tools to help write manuscripts and about 15% said they had used them to help writing grant applications. Tom Henzinger, a computer scientist member of the ERC Scientific Council, is quoted saying that generative AI, such as ChatGPT, seems no different from running text by a colleague for feedback. According to another computer scientist at Imperial College London, regardless of the ever-changing rules around generative AI, researchers will continue to use it, as there is no way of policing the use of technology like ChatGPT.

BTVB has not provided so far any guidance to Authors, Section Editors and Reviewers on the use of generative AI or specific disclosure criteria, applied to the writing process. PAGEPress Publications, the publisher of BTVB, will soon publish a general policy regarding the use of AI which will also be applied to our journal.

As the Editor in Chief of BTVB, I took the liberty to ask ChatGPT to write an abstract of the narrative review on platelets and aspirin, included in the present issue of the Journal. As mentioned by Gresele,¹ I also asked ChatGPT to re-write the abstract according to a Shakespeare style, a kind of request already formulated by Valentin Fuster, the Editor of *JACC*.⁴

Here below, the readers will find both abstracts, I carefully reviewed, for their reading (with some pleasure, hopefully) and comments.

Abstract generated by ChatGPT (upon uploading of the whole review text, references excluded)

The paper "Blood platelets, prostaglandins and aspirin: a historical and personal rereading" by Giovanni de Gaetano and Chiara Cerletti offers a comprehensive overview of the historical development and personal contributions to the understanding of aspirin pharmacology and its clinical implications. The review emphasizes the pivotal role of platelets and aspirin in hemostasis, thrombosis, and beyond.

The first section highlights the early discoveries of platelets and the subsequent recognition of their importance in hemostasis. The convergence of platelet research with the introduction of aspirin in the late 19th century set the stage for exploring aspirin's effects on platelet function.

The paper then delves into the landmark discoveries of platelet physiology, including the role of aspirin in inhibiting platelet aggregation by irreversibly acetylating platelet cyclooxygenase. The emergence of the "aspirin dilemma" concerning its dual inhibition of thromboxane A₂ (TXA₂) and prostacyclin (PGI₂) biosynthesis is discussed, leading to debates on optimal dosing for antithrombotic effects while minimizing adverse effects.

The concept of low-dose aspirin therapy is explored in detail, emphasizing its molecular basis and clinical implications. Mechanisms underlying the selective inhibition of platelet function by low-dose aspirin are elucidated, paving the way for its widespread use in cardiovascular disease prevention.

The paper also touches upon aspirin's potential applications beyond cardiovascular disease, including its role in cancer prevention and neurodegenerative diseases, hinting at future research directions.

Three paragraphs within the paper provide additional insights:

- i. The development of the low-dose aspirin concept and its clinical application, highlighting the transition from empirical trials to molecular understanding and randomized clinical trials.
- ii. The implications of the salicylate-aspirin interaction, discussing the biochemical selectivity of aspirin and its clinical relevance in optimizing therapeutic outcomes.
- iii. Platelet turnover and aspirin in type 2 diabetes, outlining early observations and ongoing research on the application of aspirin therapy in diabetic patients.

Overall, the paper offers a rich historical narrative intertwined with personal experiences and scientific insights, shedding light on the intricate relationship between blood platelets, prostaglandins, and aspirin in health and disease.

Abstract generated by ChatGPT, in a Shakespeare's style

Verily, in the annals of science, a tale unfolds, Of blood platelets, prostaglandins, and aspirin bold. Giovanni de Gaetano and fair Chiara Cerletti, Their pens doth weave a saga of discovery.

Once upon a time, in centuries past, Platelets lay dormant, their secret cast. 'Twas Giulio Bizzozero who first did see, These tiny cells, their role yet to decree.

In the realm of medicine, a new dawn did arise, With aspirin, a remedy of great prize. Born fifteen years after platelets were known, Its tale entwined with platelets, newly shown.

Aspirin, a potent elixir, 'twas found, To hinder platelets, their functions bound. In the late Fifties, peers and scholars, Discovered its effects, amidst clinical fears.

But lo! A dilemma, a quandary profound, Aspirin, a double-edged sword they found. Thromboxane A2, and prostacyclin fair, Both succumbed to aspirin's potent snare.

Yet in this conundrum, a glimmer of light, Low-dose aspirin, a strategy bright. Patrono and scholars, with wisdom untold, Revealed its secrets, its mysteries unfold.

Verily, the interplay 'twixt salicylate and aspirin doth reveal A tangled web of pharmacological zeal. In this dance of molecules, a tale untold, Lies the balance 'twixt remedy and woes unfold.

As a final, the tale doth widen, Of platelet turnover, and hopes unbidden. In diabetics' veins, a different story, Aspirin's role, yet shrouded in glory.

Thus ends our tale, of aspirin's quest, A journey of discovery, put to the test. Shakespearean in style, this narrative grand, Of blood, of pills, in science's hand.

References

1. Gresele P. Artificial intelligence and machine learning in hemostasis and thrombosis. *Bleeding, Thrombosis and Vascular Biology* 2023;2:105.
2. Ganjavi C, Eppler MB, Pekcan A, et al. Publishers' and journals' instructions to authors on use of generative artificial intelligence in academic and scientific publishing: bibliometric analysis. *BMJ* 2024;384:e077192.
3. Prillaman M. Is ChatGPT making scientists hyper-productive? The highs and lows of using AI. *Nature*. 2024;627:16-7.
4. Dauerman HL, Turco JV, Fuster V. Artificial Intelligence, Bob Dylan, and Cardiovascular Scholarship. *J Am Coll Cardiol*. 2023;82:961-3.